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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/083,991	02/26/2002	Chia-Der Chang	TS01-660	5768

28112 7590 11/29/2002

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EXAMINER

ISAAC, STANETTA D

ART UNIT	PAPER NUMBER
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2812

DATE MAILED: 11/29/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/083,991

Applicant(s)

CHANG ET AL.

Examiner

Stanetta D. Isaac

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- ☐ Interview Summary (PTO-413) Paper No(s) ____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-19 rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng et al.

Patent Number 5,728,621 in view of Detzel et al. Patent Number 6,287,174.

3. Zheng discloses a method substantially as claimed. See **FIGS. 1-10**, where Zheng teaches a method of planarizing substrates having shallow trench isolation, comprising:

providing a substrate **10**;

forming trenches **16** in said substrate;

depositing a layer of dielectric **18** on said substrate thereby filling said trenches with said dielectric;

forming a layer of resist **20** on said layer of dielectric;

removing all of said layer of resist and part of said layer of dielectric using said polishing pad and chemical mechanical polishing thereby leaving said trenches filled with trench dielectric and forming a planar surface.

4. Pertaining to claim 2, Zheng teaches the method of claim 1 wherein said substrate is a silicon wafer having devices formed therein.

5. Pertaining to claim 3, Zheng teaches the method of claim 1 wherein said dielectric is silicon dioxide deposited using high density plasma chemical vapor deposition.

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6. Pertaining to claim 4, Zheng teaches the method of claim 1 wherein said trenches are shallow trench isolation trenches.
7. Pertaining to claim 5, Zheng teaches the method of claim 1 wherein said layer of resist is formed by spinning resist on said substrate followed by baking said resist.
8. Pertaining to claim 6, Zheng teaches the method of claim 1 wherein said resist. is photoresist.
9. Pertaining to claim 7, Zheng teaches the method of claim 6 wherein said photoresist is formed by spinning said photoresist on said substrate followed by baking said photoresist.
10. Pertaining to claim 8, Zheng teaches the method of claim 1 wherein said removing said layer of resist and part of said layer of dielectric removes that part of said layer of dielectric above said substrate.
11. Pertaining to claim 9, Zheng teaches the method of claim 1 further comprising:
 - forming a layer of pad oxide **12** on said substrate before said forming trenches in said substrate;
 - forming a layer of silicon nitride **14** on said layer of pad oxide before said forming trenches in said substrate; and
 - forming trench openings **16** in said layer of pad oxide and said layer of silicon nitride before said forming trenches in said substrate.
12. Pertaining to claim 10, Zheng teaches the method of claim 9 wherein said removing said layer of resist and part of said layer of dielectric removes that part of said layer of dielectric above said layer of silicon nitride.

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13. Pertaining to claim 11, Zheng teaches a method of planarizing substrates having shallow trench isolation, comprising:

providing a substrate **10**;

forming a dielectric base (**12, 14**) on said substrate;

forming trench openings **16** in said dielectric base;

forming trenches in said substrate directly below said trench openings in said dielectric base;

depositing a layer of trench dielectric **18** on said dielectric base thereby filling said trenches with said trench dielectric;

forming a layer of resist on **20** said layer of trench dielectric;

removing all of said layer of resist and part of said layer of trench dielectric using said polishing pad and chemical mechanical polishing thereby leaving trench dielectric in said trenches and forming a planar surface.

Pertaining to **claims 1 and 11**,

However, Zheng fails the providing a polishing pad having a hardness of at least Shore "D" 52. See **FIG. 1** where Detzel teaches providing a polishing pad having a hardness of at least Shore "D" 52. In view of Detzel, it would have been obvious to one of ordinary skill in the art to incorporate the process step of Detzel in to Zheng semiconductor method because most preferred pad comprises a polishing layer where a hardness of 25 to 80 Shore D. (See **col. 4 lines 1-25**)

14. Pertaining to claim 12, Zheng teaches the method of claim 11 wherein said substrate is a silicon substrate having devices formed therein.

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15. Pertaining to claim 13, Zheng teaches the method of claim 11 wherein said trench dielectric is silicon dioxide deposited using high density plasma chemical vapor deposition.

16. Pertaining to claim 14, Zheng teaches the method of claim 11 wherein said dielectric base comprises a layer of pad oxide formed on said substrate and a layer of silicon nitride on said layer of pad oxide.

17. Pertaining to claim 15, Zheng teaches the method of claim 14 wherein said removing said layer of resist and part of said layer of dielectric removes that part of said layer of dielectric above said layer of silicon nitride.

18. Pertaining to claim 16, Zheng teaches the method of claim 11 wherein said layer of resist is formed by spinning resist on said substrate followed by baking said resist.

19. Pertaining to claim 17, Zheng teaches the method of claim 11 wherein said resist is photoresist.

20. Pertaining to claim 18, Zheng teaches the method of claim 16 wherein said photoresist is formed by spinning said photoresist on said substrate followed by baking said photoresist.

21. Pertaining to claim 19, Zheng teaches the method of claim 11 wherein said removing said layer of resist and part of said layer of dielectric removes that part of said layer of dielectric above said dielectric base.

22. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

23. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**

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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stanetta D. Isaac whose telephone number is 703-308-5871. The examiner can normally be reached on Monday-Friday 7:30am -5:30pm.

25. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Nebling can be reached on 703-308-3325. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-3432 for After Final communications.

26. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Stanetta Isaac
Patent Examiner
November 25, 2002


John F. Niebling
Supervisory Patent Examiner
Technology Center 2800